

REMARKS

The undersigned attorney would like to thank the Examiner for holding the telephonic interview on Wednesday, April 16, 2003. The conversation provided an opportunity to explain the unexpected result of reduced hysteresis exhibited by the presently claimed composition in comparison to prior art compositions.

Claims 13 and 15-29 are pending. Claims 28 and 29 have been added. New claims 28 and 29 are based on pending claim 13, which contains the limitation that the claimed composition satisfies at least one of features (i) and/or (ii): (i) the composition comprises at least one diene polymer which has at least one amino terminal group of an aliphatic or cycloaliphatic amine which is bonded thereto at the end of the chain, the polymer then being devoid of alkoxysilane and silanol group; and (ii) the composition comprises at least one free aliphatic or cycloaliphatic amine. New claim 28 recites only feature (i) and new claim 29 recites both features (i) and (ii).

The specification has also been amended to correct inadvertent typographical errors found throughout the specification. Applicants submit that no new matter has been introduced by the newly added claims or the amendments to the specification. Support for the amendments is found in the specification and claims as originally filed.

35 U.S.C. §103(a) rejection (Hojo in view of Jalics et al.)

As indicated in the Advisory Action mailed August 30, 2002, the Examiner has maintained the rejection of claims 13, 15-22 and 24-27 under 35 U.S.C. § 103(a) as being unpatentable over Hojo (US 5,939,493) in view of Jalics et al. (US 5,708,053). The Examiner alleges that it would have been obvious to one of ordinary skill in the art to use the guanidine disclosed in Jalics et al. to control the time and temperature for vulcanization of the rubber composition of Hojo to arrive at the presently claimed composition. Furthermore, the Examiner asserts that Example 4 of the present specification does not successfully establish unexpected or surprising results over the cited art, given that the data does not show a proper side-by-side comparison between the composition of the present invention, i.e. composition 19, and the composition outside of the scope of the present invention.

Applicants respectfully submit that the comparison of the compositions in Example 4 sufficiently demonstrate unexpected results of reduced hysteresis for compositions of the present invention in comparison to control compositions. In further support of the comparison found at pages 32-35 of the specification, Applicants submit the enclosed Declaration of Gerard Labauze.

The Labauze Declaration provides support for the use of a "virtual" control composition 17', comparable to control composition 17 of Example 4. Control composition 17 is a rubber composition comprising (1) a polymer, (2) silica as a filler, (3) a silica/polymer linking agent, and (4) the aliphatic amine, dodecylhexamethylenemine (DDCHMI) in the amount of 7.1 mmol. In comparison, the virtual control composition 17' is a rubber composition comprising (1) a polymer, (2) silica as a filler, (3) a silica/polymer linking agent, and (4) the aliphatic amine,

dodecylhexamethylenemine (DDCHMI) in the amount of **4.5** mmol. The components of the two compositions, 17 and 17', vary only in the amount of DDCHMI. The presence of hydroxyl groups on silica particles in a rubber composition promote undesired interactions between silica particles, increasing hysteresis loss. These interactions can be shielded by covering agents, e.g. free amines, such as DDCHMI. **Decreasing** the amount of DDCHMI in a rubber composition would cause a decrease in the coating, or covering, of these hydroxyl groups, promoting the interactions between silica and creating **increased** hysteretic losses. Given that all components other than DDCHMI of virtual control composition 17' are identical to components of composition 17, measurements of the deformation in the virtual control composition 17' would produce a  $\text{tg}\delta$  of less than less than 0.308 and  $G''$  of less than 1.050 (see Table 1 below).

Example 4 of the specification shows a side by side comparison of composition 19, which is a rubber composition vulcanizable with sulfur and usable as a tire tread, comprising (1) a polymer, (2) silica as a filler, (3) a silica/polymer linking agent, (4) a guanidine (diphenylguanidine; DPG), and (5) an aliphatic amine (dodecylhexamethylenemine; DDCHMI), with various control compositions 16-18. Composition 19 contains 7.1 mmol DPG and **4.5** mmol DDCHMI, whereas virtual control composition 17' contains **4.5** mmol DDCHMI. Comparison of composition 19 with virtual control composition 17', at low deformation ( $\text{tg}\delta$  and  $G''$ ), shows that the composition of the present invention, 19, demonstrates an improved reduced hysteresis in comparison to the control composition 17' (Table 1).

Table 1. Comparison of composition 19 with control and virtual control compositions

(adapted from Table 5 at page 34 of the specification)

Composition	16	18	17	17' (virtual)	19
guanidine/ DPG (mmol)	7.1	11.8	none	<b>none</b>	7.1
amine/ DDCHMI (mmol)	none	none	7.1	<b>4.5</b>	4.5
tg $\delta$	0.355	0.306	0.308	<b>less than 0.308</b>	0.254
G''	1.230	0.872	1.050	<b>less than 1.050</b>	0.605

In addition, comparison of composition 19, having 7.1 mmol of DPG and 4.5 mmol of DDCHMI, with control composition 16, having 7.1 mmol of DPG, also demonstrates the superior results obtained with the combined use of guanidine (DPG) and amine (DDCHMI). Composition 19 shows a reduced hysteretic loss in comparison to control composition 16 (tg  $\delta$  - 0.254 in comparison to 0.355 and G'' - 0.605 in comparison to 1.230).

Furthermore, Applicants respectfully submit that Jalics et al. teach away from the present invention. Jalics et al. expressly provide a rubber composition with a reinforcing filler having a very specific precipitated silica having a silane-modified elastomer which is designed to improve the processing of the non-vulcanized composition by reducing work input required during mixing (column 12, line 29). Examples 1 to 4 show the process for preparing this specific pretreated silica, the result is **formation *in situ* of a covering system** on the silica particles. In contrast, the present invention requires the addition of **free** covering agents comprising free guanidine and free aliphatic or cycloaliphatic amine.

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The only demonstration of the use of a free covering agent is found in the control compositions of Example 5 (col. 11-12). Example 5 shows a comparison of rubber compositions (3 and 5 in Table I) having a silane-modified elastomer, with control composition (1) comprising an untreated silica or control compositions (2 and 4) comprising both untreated silica and a free, or separate covering agent made of silane-modified elastomer. Control compositions 1, 2 and 4 do not have the desired properties of reduced work input during mixing, improved energy construction, etc. Thus, Jalics et al. teach away from the compositions of the present invention.

For all the foregoing reasons, Applicants respectfully request the withdrawal of the rejection of claims 13, 15-22 and 24-27 under 35 U.S.C. § 103(a).

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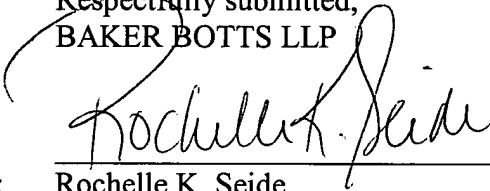
CONCLUSION

Based on the foregoing amendments and remarks, Applicants submit that the present application is in condition for allowance. A Notice of Allowance is respectfully requested.

The Commissioner is hereby authorized to charge payment of any fees or credit any overpayment made in association with this communication to Deposit Account No. 02-4377. Duplicate copies of this page are enclosed.

Respectfully submitted,  
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Attachment  
Declaration of Gerard Labauze